Phis.s 93-94°; bp<sub>12</sub> 86°.  $d_4^{20}$  0.8733.  $n_5^{20}$  1.4673. 19.3°. Soluble in 10 vol 50% alc, 4 vol 60% alc. dl-Form. bp720 194-197°; bp14 89-91°. d18 0.865.
USE: In perfumery instead of bergamot or French lavender since it has an odor similar to these oils.

a-rorm; cortanaroi. pp760 198-200"; pp26 114-114.5"

Linalyl Acetate. Bergamol. CH<sub>3</sub>COOC<sub>10</sub>H<sub>17</sub>; mol wt \$\mathbb{B}\$.28. C<sub>12</sub>H<sub>20</sub>O<sub>2</sub>; C 73.43%, H 10.27%, O 16.30%. Most shall be constituent of bergamot and lavender oils, also cond in many other volatile oils.

liquid; bergamot odor.  $d_4^{20}$  0.895. bp 220°.  $n_D^{20}$  1.4460. nsoluble in water; miscible with alcohol, ether. USE In perfumery.

Limmarin. Phaseolunatin. C<sub>10</sub>H<sub>17</sub>NO<sub>6</sub>; mol wt 247.24. C 48.5 , H 6.93%, N 5.67%, O 38.83%. From the seed kins c inbryos of flax: Jorissen, Hairs, Bull. Acad. Roy. Gci. Be [3] 21, 529 (1891); André et al., Compt. Rend. 231, 190 (1990); Lüdtke, Biochem. Z. 323, 428 (1953). Synthesis: Fische, Anger, Ber. 52, 854 (1919). Biosynthesis in white Hover Butter Butter Nature 187, 789 (1960). lover: Butler, Butler, Nature 187, 780 (1960).

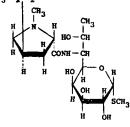
Bitter needles, mp 142-143°. [a] $_{\rm D}^{18}$  -29° (in water). sely sol in water, cold alcohol, hot acctone; slightly in hot byl acetate, ether, benzene, chloroform; practically insol in ear ether. Evolves HCN with linseed meal but not with

Tetraacetate, C18H25NO10, needles from alcohol, mp 140-1°.  $[\alpha]_D^{14}$  -10.8° (acetone). Soluble in acetone, ethyl etate, chloroform, glacial acetic acid, benzene, warm/ ethanol and ethanol; practically insol in petr ether.

Linarin. Acacetin-\(\beta\)-rutinoside; linarigenin-glucoside; 7-dihydroxy-4'-methoxyflavone-p-glucosido-L-rhamnoside; iddleoflavonoloside. C28H32O14; mol wt 592.54. 56.75%, H 5.44%, O 37.80%. From the flowers of Linaria Igaris Mill., Scrophulariaceae: Merz, Wu, Arch. Pharm. 4, 126 (1936); from Cirsium oleraceum Scop., Compositae: agner et al., ibid. 293, 1053 (1960). Structure: Baker et al., Chem. Soc. 1951, 691. Synthesis: Zemplén, Bognár, Ber., 1818 (1941).

Monohydrate, C22H22O14.H2O, needles from methanol,  $268-270^{\circ}$ .  $[\alpha]_{\rm D}^{26}-100^{\circ}$  (0.07 g in 10 ml glacial acetic id); [a]? -87° (0.05 g in pyridine). Practically insol in ter and the usual organic solvents. Soluble in nitrobenne, phenol, aniline, pyridine, concd acids and alkalies. The ter of crystn cannot be removed at 100° in vacuo over Os (Merz); may be removed at 138° in high vacuum emplén). Hydrolysis gives 5,7-dihydroxy-4'-methoxy-vone. D-slucose, and L-rhammose.

> leoxy-6-(1-methyl-4-propyl-2-D-erythro-D-galacto-octopy-Albiotic. C18H24N2O6S; 43%, N 6.89%, O 23.61%, by Streptomyces lincolnensis



Free base, pK'<sub>a</sub> 7.6. No ultraviolet absorption max (220-400 m u). More stable in salt form. Soluble in methanol. ethanol, butanol, isopropanol, ethyl acetate, n-butyl acetate, amyl acetate, acetone, methyl ethyl ketone, isopropyl nbutyl ketone, methylene chloride, chloroform, ethylene dichloride. Somewhat sol in water. See: Bergy et al.,

Hydrochloride, C<sub>18</sub>H<sub>24</sub>N<sub>2</sub>O<sub>6</sub>S.HCl. ½H<sub>2</sub>O, Frademicina, Lincocin, Mycivin. Formerly obtained as needle-like crystals of low sp gr from aq soln by rapid addition of acetone at low temps; now obtained as crystals of higher sp gr, with cubic crystal structure and greater solubility in HCl, by slow addition of acetone: Neth. pat. Appl. 6,409,689 (1965 to Upjohn Co.), C.A. 63, 5458f (1965). mp 145-147°.  $[\alpha]_{0}^{25} + 137^{\circ}$  (c = 1 in water). No ultraviolet absorption max (220-400 m µ). Freely sol in water, methanol, ethanol; sparingly sol in most organic solvents other than hydro-

MED USE: Antimicrobial. Dose: Oral 500 mg; i.m., i.v. 600 mg. Side Effects: G.I. symptoms, pruritus, urticaria may occur.

Hon; incorrect name: benzene hexachloride; gamma benzene hexachloride [not to be confused with hexachlorobenzene), Gammexane; Gexane; 666; Ben-Hex; BHC; Aphilina; Aparasin; Streunex; Tri-6; Lorexane; Kwell; Jacutin. CeHeCle; mol wt 290.85. C 24.78%, H 2.08%, Cl 73.14%. Eight well-described stereoisomers. The gamma isomer is the effective insecticide, hence the names Gammexane, Gexane, etc. The early technical mixture, prepd by the chlorination of benzene in the presence of light, contained about 12% of the  $\gamma$ -isomer and about 12% of the  $\beta$ -isomer, large amounts of the a-isomer were also present. Prepns sold for pharmaceutical or medicinal purposes now contain at least 99% pure y-isomer as the active ingredient. The cisleast 99% pure  $\gamma$ -isomer as the active ingredient. The different trans relationships of the Cl substituents in the different isomers are:  $\alpha = 1,2,4/3,5,6$ ;  $\beta = 1,3,5/2,4,6$ ;  $\gamma = 1,2,4,5/6$ ;  $\delta = 1,2,3,4/5,6$ ;  $\delta = 1,2,3/5,6$ I.C.I.). Nomenclature and structure: Hornstein, Science 121, 206 (1955).

a-Isomer: crystals from alcohol. Persistent acrid odor, mp 158°. Vapor press. 0.06 mm. Hg at 40°. Volatile with steam. Insoluble in water. Soluble in 22.8 parts chloroform at 15.25°; in 15.4 parts benzene at 18.25°

β-Isomer: crystals from alcohol. mp 312°. Sublimes after melting. Not volatile with steam. Vapor press 0.17 mm Ha at. 40°. Schulde in 775 parts chloroform at 20°, in 712 parts benzene at 17.25°.

7-Isomer: crystals, mp 112.5°. Slight musty odor. Vapor press, 0.14 mm Hg at 40°. Soluble in 13.5 parts chloroform at 20°, in 19 parts abs alcohol, in 2 parts acctone, in 5.5 parts ether, in 3 parts benzene. Insoluble in water.

USE: Insecticide.

Topical use may cause local sensitivity reactions. Vapors may irritate eyes, nose, throat. Caution: Avoid prolonged or repeated applications. VET USE: Parasiticide for ectoparasites.

Linnacite. Co.S4-cobalt sulfide.

Linoleic Acid. cis-9,cis-12-Octadecadienoic acid; 9,12tinoleic acid; linolic acid. C16H22O2; mol wt 280.44. C 77.09%, H 11.50%, O 11.41%. An essential fatty acid, component of vitamin F. Major constituent of many vegetable oils, e.g., cottonseed, soybean, peanut, corn, sunflowerseed, safflowerseed, poppyseed, linseed, and perilla oils, where it occurs as a glyceride. Characteristic ingredient of semi-drying oils. Isoln: Swern, Parker, J. Am. Oil Chemists' Soc. 30, 5 (1953); Parker et al., Biochem. Prepns. 4, 86 (1955); McCutcheon, Org. Syn. coll. vol. III, 526 (1955). Summary of the controller of the control work on structure: T. P. Hilditch, The Chemical Constitution of Natural Fats (Chapman & Hall, London, 2nd ed 1956). aj Naturai rais (Chapman & Hall, London, 2nd ed 1950). Synthesis: Raphael, Sondheimer, J. Chem. Soc. 1950, 2102; Gensler, Thomas, J. Am. Chem. Soc. 73, 4601 (1951); Walborsky et al., ibid. 2590; Nigam, Weedon, J. Chem. Soc. 1956, 4052; Osbond, Wickens, Chemistry & Industry (London) 1959, 1288.

Colorless oil. Easily oxidized by air, cannot be distilled without decompn. Storage in ester form is recommended.  $d_4^{18}$  0.9038;  $d_4^{22}$  0.9007. mp -12°. bp<sub>1.4</sub> 202°; bp<sub>18</sub> 230°.  $n_{\rm D}^{11.8}$  1.4715;  $n_{\rm D}^{20}$  1.4699;  $n_{\rm D}^{21.8}$  1.4683;  $n_{\rm D}^{80}$  1.4588. Iodine value: 181.1. Thiocyanogen value 96.7. Freely sol in ether. Soluble in abs alc. One ml dissolves in 10 ml petr ether. Miscible with dimethylformamide, fat solvents, oils.

Aluminum salt, Al(C18H28O2)3. Yellow lumps or powder; linseed oil odor. Practically insol in water; sol in oils, fixed alkali hydroxides.

Methyl Ester see Methyl Linoleate.

Ethyl Ester see Ethyl Linoleate.

USE: Manuf paints, coatings, emulsifiers, vitamins. Aluminum salt used to manuf lacquers.

MED USE: Essential nutrient. Human Toxicity: No systemic toxicity. Locally can cause mild irritation. Large doses orally can cause nausea and vomiting.

Linolenic Acid. 9,12,15-Octadecatrienoic acid. CH<sub>2</sub>-(CH<sub>2</sub>CH=CH)<sub>2</sub>CH<sub>2</sub>(CH<sub>2</sub>)<sub>2</sub>COOH; mol wt 278.42. C<sub>2</sub>-H<sub>2</sub>O<sub>2</sub>; C 77.65%, H 10.86%, O 11.49%. Occurs as the glyceride in most drying oils. Synthesis: Nigam, Weedon, J. Chem. Soc. 1956, 4049; Osbond, Wickens, Chemistry & Including (London) 1959, 1288.

Colorless liquid. die 0.914. bp. 230-232°. Insoluble in water: sol in organic solvents.

MED USE: Dietary supplement.

Linseed. Flaxseed; linum. Dried ripe seeds of Linum usitatissimum L., Linaceae. Source of linseed oil. Constit. 30-40% oil, about 6% mucilage, about 25% proteins and linamazir.

MED USE: Topical demulcent, emollient.
VET USE: The crushed seeds were for VET USE: The crushed seeds were formerly used as a

> Linseed Oil. The oil obtained by expression of linseed. onsiit. Glycerides of linolenic, linoleic, oleic, stearic,

1.4750. Does not congeal above -Iodine no. not below 170. Unsaj -20°. Sapon no. 187-195. 1.5%. Slightly sol in alcohol, aponifiable matter not over ether, petr ether, carbon disulfide, miscible with chloroform,

USE: In varnishes, paints, pe, oil turpentine, printing inks, artificial rubber, toutty, oilcloths, linoleum, enameling leather; applied to patracing cloth, tanning and aper and fabrics to render

them waterproof and tough. MED USE: Emollient in liniment VET USE: Laxative for large its, pastes, medicinal soaps.

500-750 ml; sheep and swine: animals. Dose: horses: . 120-180 ml. Note: Not suitable for small animals.

Linseed Oil, Sulfurated. This A soln of sulfur in linseed oil, preiolinic acid; balsam sulfur. Brownish-red viscid oil. Solublepd by aid of heat. ile in oil of turpentine.

Lipase. An enzyme (or more e belonging to the esterases. Hydroxactly a group of enzymes) form, such as glycerides) yieldin olyzes fats (present in ester Catalyzes digestion. Widely disting fatty acids and glycerol. also in molds, bacteria, milk aiributed in the plant world. animal tissues, especially in the pind milk products, and in beans: H. Gibian in Ullmanns Exancreas. Isoln from castor Chemie, 3rd ed, vol. 7, pp 406-40/ncyklopädie der technischen The optimum temp for enzyd7 (1956).

and 37° at pH 5-6. Lipase containic action is between 35° inactivated by substances that itins sulfhydryl groups and is activated by substances that keepshibit such compds. It is state, such as glutathione, cystein SH groups in the reduced addition of acid activates lipasete, and ascorbic acid. The lipase is activated by sulfuric, preparations. Castor-oil butyric acids. Acetic, salicylic ioxalic, formic, acetic and crease the action of lipase derived and hydrochloric acids inpig. Caprylic and caproic acids ir from various organs of the derived from certain mold fungi. acrease the action of lipase decrease lipase activity, petr ether Almost all organic solvents USE: To split fats without dams being an exception.

such as vitamins or unsaturated figing sensitive constituents, MED USE: Digestive aid.

Lipoprotein Lipase. Clearing which perferentially hydrolyzes factor. A specific lipase in the form of lipoproteins or chylriglycerides when they are and unesterified fatty acids: Homicrons, forming glycerod fatty acids: Homicrons for the f N. O. Kaplan, 'Methods in Enr. orn in S. P. Colowick, Press, New York, 1962), p 542. ymology vol. 5 (Academic of animals injected intravenously first detected in the plasma factor" that rapidly dissipated with heparin as a "clearing Hahn, Science 98, 19 (1943); Ro alimentary hyperlipemia: Rev. 12, 241 (1960). Prepn from pinson, French, Pharmacol Baskys, Diss. Abstr. 20, 1146 (1960stheparin human plasma; from several tissues of normal, 19). It has since been preid from chicken adipose tissue: Kountreated animals. Pon 226, 833 (1957); from human hern, Quigley, J. Biol. Physiol. 205, 401 (1963). Role art: Schnatz et al. glycerides by adipose tissues: Rain the metabolism of Fat as a Tissue (McGraw-Hill, Nedbell, Scow in K. Rogal, w York, 1964), pp 110-12.

Lippia. Fog-fruit. Whole plant of Lippia dulcis ve mexicana Trev., Verbenaceae. plant of Lippia dulcis ve labit. Mexico. Constit. A volatile camphor, volatile oil.

Lithiophilite. Li<sub>2</sub>O.2MnO. phosphate.

Lithium. Li; at. wt 6.939; at. 7 (92.1%); 6 (7.9%). Occurno. 3; valence 1. Isotopes: 0.005%. Discovered in 1817 ence in the earth's crust: 0.005%. Discovered in 1817 ance in the earth's crust: Phys. [2] 10, 82 (1819). An element Arfvedson: Ann. Chim. occurs in a number of minerat of the alkali-metal group; lepidolite, and triphylite contains; spodumene, eucryptite, replacement, and triphylite contain from 3 to 10% lithium and are the most important sources of it. Prepn of the metal by electrochemical processes: Guntz, Compt. Rend. 117, 732 (1893); Ruff, Johannsen, Z. Electrochem. 12, 186 (1906); by reduction of the oxide with magnesium or aluminum: Warren, Chem. News 74, 6 (1896); Hanson, U.S. pat. 2,028,390 (1936).

Consult the cross index before using this section



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